CLAIMS

1. A positioning control method wherein driving means for driving a table holding a workpiece and movable in a predetermined direction and measuring means for measuring the displacement of said driving means and the position of the table are provided on a base and wherein the workpiece held on the table is positioned to a target position using a displacement signal measured by said measuring means, the method being characterized in that a compensator is provided based on a definition of a base vibration model having:

a motor transfer function for generating motor displacement from an input that is the sum of input torque and a table propelling force multiplied with a reducer and Cartesian-to-polar coordinate transformation constant;

a table transfer function for multiplying a deviation between an output that is said motor displacement multiplied with a reducer and polar-to-Cartesian coordinate transformation constant and table displacement with a table-displacement-to-force conversion spring constant to generate said table propelling force and to output table displacement from said table propelling force; and

a base driving transfer function for generating base displacement by multiplying the base displacement with a base-displacement-to-force conversion spring coefficient and inputting the same with said table propelling force, table displacement being generated from a difference between said table displacement and said base displacement.

2. A positioning control method according to Claim 1, characterized in that when a motor controller is configured to control the table position by positioning the motor based on only a motor position detection signal, a pre-compensator is provided by adding a motor controller model to which a position target value is input upstream of the motor transfer function of said compensator and in that said pre-compensator outputs a position command, time sequential data of the motor model position, time sequential data of a torque model command, and a compensation value for suppressing base vibration to said motor controller.

3. A positioning control method according to Claim 2, characterized in that when said motor controller is configured to control the table position based on a motor position detection signal and a table position detection signal, a pre-compensator is provided by adding a position compensator model upstream of the motor

controller model of said pre-compensator and in that said pre-compensator outputs a position command, time sequential data of the motor model position, time sequential data of the torque model command, time sequential data of a motor position command model, and a compensation value for suppressing base vibration to said motor controller.

4. A positioning control method according to Claim 1, characterized in that when said motor controller is configured to control the table position by positioning the motor based on only a motor position detection signal, characterized in that a state estimator is constituted by said compensator and in that a compensator for providing feedback of an estimated displacement value of the base is added.

5. A positioning control method according to Claim 4, characterized in that when said motor controller is configured to control the table position based on the motor position detection signal and the table position detection signal, a state estimator is constituted by said compensator to provide feedback of an estimated displacement value of the base.

6. A positioning control method according to Claim 1, characterized in that when the motor controller is configured to control the table position by positioning

the motor based on only the motor position detection signal, a pre-compensator is provided by adding a controller model to which a position target value is input upstream of the motor transfer function of said compensator, said controller model determining a torque model command from signals obtained by multiplying base state quantities of the base vibration model with a gain and a position target value, the state quantities being represented by the relative position and speed of the base position and table position, the base position and the speed of the same, and a deviation between the table position and the motor position and the speed of the same in the base vibration model according to Claim 1 and in that said compensator outputs time sequential data of the position model command, time sequential data of the motor model position, and time sequential data of the torque model command to a conventional controller.

7. A positioning control method according to Claim 6, characterized in that when the motor controller is configured to control the table position based on a motor position detection signal and a table position detection signal, said pre-compensator is provided by adding a controller model to which a target position value is input upstream of the motor transfer function of said compensator and in that said controller model determining

a torque model command from signals obtained by multiplying base state quantities of the base vibration model with a gain and a position target value, the state quantities being represented by the relative position and speed of the base position and table position, the base position and the speed of the same, and a deviation between the table position and the motor position and the speed of the same in the base vibration model according to Claim 1 and in that said compensator outputs time sequential data of the position model command, time sequential data of the motor model position, and time sequential data of the torque model command to a conventional controller.

8. A positioning control method according to Claim 1, characterized in that coefficients and transformation constants of each transfer function in the base vibration model are determined by:

driving an actual machine to acquire a torque command and state quantities of the actual machine at a first processing step;

determining parameters of the base vibration model using genetic algorithm at a second processing step;

driving the actual machine according to rules for control

utilizing the base vibration model thus determined at

a third processing step; and

evaluating results of the third processing step at a fourth processing step to automatically and accurately identify the parameters of the base vibration model by terminating the evaluation of specifications are satisfied and repeating the second and later processing steps if not satisfied.